

**REMARKS**

Applicant thanks the Examiner for rendering moot the rejection under 35 U.S.C §103(a) over Bay et al. and Fessenden. et al. in the previous office action.

The Examiner rejects Claims 1-27 under 35 U.S.C 103(a) over Maurer et al. and further in view of Bay et. al. and Fessenden et al.. The Examiner explains that Maurer et al. teaches the process for the preparation of 2-chloropyridines using the Sandmeyer reaction. The Examiner states the Cu(I) ion acts as a catalyst in these reactions (see page 508-509 of Fessenden) and that Bay et al. (see page 2858) teaches that the Sandmeyer reaction is normally used to achieve the regiospecific chlorination of aromatic rings.

The Examiner modified her the rejection from the previous office action by adding "...and the fact that 2,3-chloropyridines (sic) of the instant process rather than 2-chloropyridines of the prior art are being produced via the Sandmeyer reaction." The Examiner alleges the claims are rendered obvious by the prior art processes.

Applicant notes the teaching of Maurer et al. do not suggest the instant claims. Maurer et al. teach away from using copper in the conversion of 2-aminopyridines to 2-chloropyridines (see page 2, line 20):

"During the diazotization of the 2-aminopyridines in concentrated hydrochloric acid, even the addition of copper powder or copper(I) chloride does not bring about any improvement in the yields of the desired chlorine derivatives."

With this teaching, one skilled in the art will be discouraged from using copper and therefore does not suggest the use of copper(II) of the instant process. Applicant's claims using "a copper catalyst wherein at least about 50% of the copper is the copper(II) oxidation state" is a non-obvious contribution over the cited reference. The use of copper is not shown in any of the experimental examples 1 through 15 of Maurer et al. (see page 3, beginning with "General instructions"). Finally, Maurer et al. only discloses the use of alkyl nitrites whereas the instant claims require the use of nitrite salts.

Applicant notes the combined teaching of Maurer et al., Bay et al. and Fessenden et al. do not suggest the use of copper(II) of the instant claims. None of the three references – individually or combined – disclose or suggest the use of copper(II) of the instant process.

Applicant's claims using "a copper catalyst wherein at least about 50% of the copper is the copper(II) oxidation state" is both a novel and non-obvious contribution over the cited references.

Furthermore there is no suggestion to combine Maurer et al. with Bay et al. or Fessenden et al. since Maurer teaches away from using either copper or copper(I) chloride (see page 2, line 20):

"During the diazotization of the 2-aminopyridines in concentrated hydrochloric acid, even the addition of copper powder or copper(I) chloride does not bring about any improvement in the yields of the desired chlorine derivatives."

Bay et al. does not correct this deficiency and, in fact also teaches away from using the previously mentioned Sandmeyer reaction (see page 2858, line 13):

"The reaction is straight-forward and high-yielding and offers a simple, inexpensive alternative to the less desirable processes mentioned previously."

Further combination with Fessenden et al. (4<sup>th</sup> ed.) still does not correct any deficiency. Fessenden et al. teaches the traditional Sandmeyer reaction stressing the requirement of only copper(I) salts (see page 509, line 1):

"For the substitution of -Cl, -Br, or -CN, a copper(I) salt is used as the source of the nucleophile, and the reaction mixture is warmed to 50–100°C."

Applicant therefore maintains that the combined teachings of Maurer et al., Bay et al. and Fessenden et al. do not disclose or suggest the limitation of the instant claims wherein "a copper catalyst wherein at least about 50% of the copper is the copper(II) oxidation state".

Applicant notes that the combined teaching of Maurer et al., Bay et al., and Fessenden et al. do not suggest the use of the Sandmeyer reaction at the 3-position of a pyridine.

The disclosure in Maurer et al. is directed to the preparation of 2-chloropyridines from the corresponding 2-aminopyridines. There is no disclosure or any examples directed to the preparation of 3-chloropyridines from 3-aminopyridines. Maurer et al. provide Examples 1 through 15 of the halogenation of substituted 2-aminopyridines. None of these Examples use a copper catalyst. Furthermore, there are no examples directed to the preparation of

3-chloropyridines from the corresponding 3-aminopyridines in the presence of “a copper catalyst wherein at least about 50% of the copper is the copper(II) oxidation state”. In fact, Maurer et al. teach away from using copper powder or copper(I) chloride in the case of 2-aminopyridines (see page 2, line 20):

“During the diazotization of the 2-aminopyridines in concentrated hydrochloric acid, even the addition of copper powder or copper(I) chloride does not bring about any improvement in the yields of the desired chlorine derivatives”.

From this teaching, one skilled in the art will not pursue the use of copper powder or copper(I) for the same transformation at the 3-position of a pyridine as a fruitful direction of research. The use of copper(II) of the instant claims is therefore a non-obvious contribution over the prior art.

Even in the combination, the teachings of Maurer et al. with Bay et al. or Fessenden et al. do not cure this deficiency. For example, the 8<sup>th</sup> example of Bay et al. shows 2,3-dichloropyridine prepared from 3-nitro-2-chloropyridine using phenyltetrachlorophosphorane (PTCP) in an 81% yield over two steps without the use of copper as a catalyst. Since Fessenden et al. teaches the Sandmeyer reaction in aromatics, but does not show any examples with aminopyridines, there is no suggestion to combine these references.

In another Example of where the combined teachings of Maurer et al. with Bay et al. and Fessenden et al. do not render obvious the instant claims is where Bay et al. uses a completely different starting material. Maurer et al. suggests that copper powder or copper(I) chloride do not bring about any improvement in yield converting an amine to a halogen, but does not suggest the combination with the use of PTCP from Bay et al. or the copper(I) salts of Fessenden et al. (the use of which is discouraged by Maurer et al.). There is therefore no suggestion to combine Maurer et al. with Bay et al. and Fessenden et al. as applied to this transformation at the 3-position of a pyridine.

#### **Response to Examiner’s Remarks:**

1. The Examiner disagrees with Applicant’s previous statement: “Further, Maurer et al. does not disclose the use of either copper(I) or copper(II) in facilitating the diazo decomposition at the 2-position.”

There are no experimental Examples in Maurer using either copper(I) or copper(II) in Maurer et al. (See page 3 in the “General instructions). Maurer et al. teach away from using

copper powder or copper(I) chloride and mentions that these reagents do “...not bring about any improvement in the yields of the desired chlorine derivatives” as discussed above. The sentence quoted by the Examiner regarding the Sandmeyer reaction from Maurer et al. is indeed correct, however the use of copper powder or copper(I) chloride is not contained in any Experimental Example of Maurer et al..

2. The Examiner notes arguments relying on the fact that displacements at the 3-position of the pyridine are very difficult and is a non-obvious result was not part of the original specification or anywhere in the patent application before the response to the above rejection and suggested placing this argument in the form of an oath or declaration (37 CFR 1.132).

Applicant maintains that no declaration under 37 CFR 1.132 is required since these arguments were supported by a prior art document (Fessenden et al. (6<sup>th</sup> Ed.)).

3. The Examiner states “It is well known in the art that copper(I) or (II) catalysts can be used in Sandmeyer reactions. See the “Sandmeyer Reaction” in Wikipedia”.

Reliance on a Wikipedia entry showing the use of copper(I) and copper(II) in the Sandmeyer reaction is common knowledge and thereby supporting the rejection of Claims 1-27 is improper. Entries in Wikipedia can be modified at any time. There is therefore no date of publication (or posting) associated with a Wikipedia entry. Since a Wikipedia entry is not available under any section of 35 U.S.C. §102 it cannot be used as prior art. See MPEP §2144.03 (Rev. 6, Sept 2007):

“It would not be appropriate for the examiner to take official notice of facts without citing a prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well-known. For example, assertions of technical facts in the areas of esoteric technology or specific knowledge of the prior art must always be supported by citation to some reference work recognized as standard in the pertinent art. *In re Ahlert*, 424 F.2d at 1091, 165 USPQ at 420-21.”

In view of the foregoing, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,

Application No.: 10/583635  
Docket No.: BA9327USPCT  
Confirmation No.: 3586

Page 6

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Dated: June 30, 2010